

Assignment 2-2 Perfect Numbers

A perfect number is a positive integer that is equal to the sum of its positive proper divisors, that is, divisors excluding the number itself. For instance, 6 has proper divisors 1, 2 and 3, and $1 + 2 + 3 = 6$, so 6 is a perfect number. The next perfect number is 28, since $1 + 2 + 4 + 7 + 14 = 28$.

You would be given several integer numbers. You have to determine if these numbers are perfect numbers. The largest perfect number in this problem will not exceed $2^{31} - 1$.

Input

The input consists of t ($30 \leq t \leq 40$) test cases. The first line of the input contains only positive integer t . Then t test cases follow. Each test case consists of exactly one line with a positive integer n which is less than 2^{31} .

Output

For each such integer n , you are to output a single line containing “perfect number” or “non-perfect number” depending on whether the integer n is a perfect number.

Sample Input

```
2
28
50
```

Sample Output

```
perfect number
non-perfect number
```